Space Science Seminar
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Application of a 1D Model of the Solar Wind Driven by Turbulence Dissipation to a 2D Magnetic Field Configuration

Dr. Roberto Lionello/Preedictive Science Inc.
(9990 Mesa Rim Rd., Suite 170, San Diego, CA)

Solar physicists are still actively investigating the mechanisms responsible for heating the Sun's corona and accelerating the solar wind, although it is widely accepted that photospheric motions provide the energy source and that the magnetic field must play a key role in the process. Cranmer et al. 2007 developed a sophisticated, 1D, time-steady model ofthe solar wind with turbulence dissipation. By varying the coronal magnetic field, they obtain, for a single choice of wave properties, a realistic range of slow and fast wind conditions with a sharp latitudinal transition between the two streams. Using the 1D, time-dependent model of the solar wind of Lionello et al. 2014, which incorporates turbulent dissipation of Alfvén waves to provide heating and acceleration of the plasma, we have explored a similar configuration, obtaining qualitatively equivalent results. However, we suspect that the bifurcation between slow and fast wind suggested by this 1D model may not occur in multidimensional MHD simulations.

http://solarscience.msfc.nasa.gov/colloquia/